

REMARKS:

Claims 1, 7 and 44 are pending in this application. Claims 28-43 and 45-47 are canceled as non-elected claims. Claims 1, 7, 17 and 44 have been amended to clarify operation of the present invention.

Applicant acknowledges with appreciation the indication that claims 11-13, 15, 21-23 and 25 contain allowable subject matter. Claims 11-15 and 21-25 have been rewritten as independent claims. Accordingly, these claims are now in condition for allowance. Reconsideration for all outstanding rejections and objections in light of the amendment and following remarks is respectfully requested.

Claims 1-9, 17-20, 26 and 44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nishizawa et al. (U.S. Patent No. 5,275,184). The rejection is respectfully traversed.

The claimed invention relates to a method for reducing contaminants from the air/liquid interface in a wet etching bath. As such, amended independent claim 1 recites a method for "rapidly removing at a non-uniform flow rate an upper portion of the semiconductor processing fluid" present in a processing bath. Similarly, amended independent claim 7 also recites a method for "reducing the contamination on a semiconductor wafer" by "rapidly removing at a non-uniform flow rate an upper portion of said etching fluid from said wet etching bath to remove contaminants from the surface of said wet etching bath." Amended claim 17 also recites a method for etching a semiconductor wafer with an etching fluid, a portion of which being "rapidly removed . . . at a non-uniform flow rate." Further, amended dependent claim 8 states that, during the process, "a substantial portion of said etching fluid is removed." Such rapid and sudden removal, which has an attendant change in velocity of the processing fluid, may be accomplished in a variety of ways, for example, by "sliding a door located at an upper portion of said bath," as recited in newly rewritten independent claims 13 and 23, by "hingedly releasing a door located at an upper portion of said bath," as recited in newly rewritten independent claims 12 and 22, or by "telescopically collapsing sidewalls" of a

vessel, as recited in newly rewritten independent claims 15 and 25. This sudden change in velocity causes “the surface tension and eddy current forces holding the contaminants at the air/liquid interface are cleaved and the contaminants flow into the outer weir where they may be collected.” (Application at 10, lines 21-25).

Nishizawa et al. (“Nishizawa”) does not disclose any of the limitations of the claimed invention. Nishizawa discloses an “apparatus for treating a wafer surface” (Col. 3, line 30) and “a system capable of rapidly substituting treatment solutions” (Col. 3, lines 19-20), but not a method for “rapidly removing at a non-uniform rate an upper portion” of the etching fluid, as independent claims 1, 7, 11-15, and 17 recite. In fact, Nishizawa discloses a “uniform treatment solution flow container having an inlet and an outlet for a treatment solution . . . for containing a uniform flow of the treatment solution.” (Col. 3, lines 32-35). According to Nishizawa, the “old treatment solution inside the container is rapidly displaced by the new treatment solution.” (Col. 3, lines 54-55). However, the displacement of the old treatment solution has a uniform flow because “the treatment solution forms a uniform flow in the container.” (Col. 3, lines 56-57). Further, Nishizawa uses a “treatment solution at constant velocity to the inlet of the treatment solution bath” (Abstract at 5-6) that requires the displacement of the old treatment solution at a constant velocity, which in turn cannot acquire a non-uniform flow attendant a sudden change in flow velocity, as in the present invention. In sum, the present invention is not anticipated by Nishizawa.

Claims 10, 16 and 27 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Nishizawa et al. (U.S. Patent No. 5,275,184) in view of Itoh et al. (U.S. Patent No. 5,795,401). These claims depend on independent claims 7 and 17, and are patentable for the reasons given above for the independent claims 7 and 17. Further, Itoh does not refer to the removal of contaminants from an etching bath. Itoh merely refers to the scrubbing of a wafer surface using a rotary brush while pressure is applied by jetting a fluid on the other surface of the wafer. Itoh does not even mention an etching fluid. Accordingly, a person of ordinary skills in the art could not have been motivated to combine Nishizawa with Itoh, and withdrawal of this rejection is respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: October 4, 2000

Respectfully submitted,

By 

Thomas J. D'Amico

Registration No.: 28,371

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorney for Applicant